



## SunPump 3.1 Zero-Carbon Solar Heat Pump

Model Number	VRHA-	12DC80GT	18DC80GT	24DC80GT	36DC80GT	48DC80GT
<b>Nominal Capacity<sup>b</sup> (Tons)</b>		1 Ton	1.5 Tons	2 Tons	3 Tons	4 Tons
Nominal Heating <sup>b</sup> (BTU/hr)		12,000 BTU	18,000 BTU	24,000 BTU	36,000 BTU	48,000 BTU
Nominal Heating <sup>b</sup> (kW)		3.5 kW	5 kW	7 kW	10 kW	14 kW
Heating Area <sup>A</sup> @13/10 BTU/ft <sup>2</sup>		~ 600-1300 ft <sup>2</sup>	~ 1000-1500 ft <sup>2</sup>	~ 1300-1800 ft <sup>2</sup>	~ 1700-2300 ft <sup>2</sup>	~ 2100-3000 ft <sup>2</sup>
<b>Performance</b>	<i>Radiant heating Entry Water Temperature is <b>90-110 F.</b> Design Range</i>					
Max. water tank top temp.		140 F./60°C.	140 F./60°C.	140 F./60°C.	140 F./60°C.	140 F./60°C.
Heating input power		0.79 kW	1.57 kW	2.12 kW	3.03 kW	4.24 kW
COP <sup>1</sup> including Solar/no solar		3.7/2.6	3.6/2.5	3.6/2.5	3.6/2.5	3.6/2.5
Indoor Noise Level		42 dB(A)	44 dB(A)	45 dB(A)	47 dB(A)	48 dB(A)
Outdoor Noise level		9 dB(A) 3 M. from panels (less noise than breathing)				
<b>Mechanical</b>	<i>Refer to local plumbing and building codes for system and installation requirements<sup>2</sup></i>					
Dimensions (in.)		23.6*25.7*72.0	23.6*25.7*72.0	23.6*25.7*72.0	23.6*25.7*72.0	23.6*25.7* <b>76.7</b>
Shipping weight		175 lbs.	175 lbs.	181 lbs.	185 lbs.	189 lbs.
Number of panels/L-feet		2/12	3 (or 4)/18/24	4/24	6/36	8/48
R410a Charge Weight		41 oz. (1160 g)	49.5 oz. (1400 g)	63.6 oz. (1800g)	81 oz. (2300 g)	102 oz. (2900 g)
Max. operating pressure		Heating 305 PSIG low side / 610 PSIG high side   Pressure Test Panels 150-200 PSIG. MAX.				
Line set charge/max length		25 ft./35 ft.	27 ft./37 ft.	30 ft./40ft.	30 ft./45ft.	30 ft./50 ft.
Add per additional foot		0.22	0.28 oz.	0.30 oz.	0.33 oz.	0.33 oz.
Liquid line OD		1/4 in.	1/4 in	3/8 in	3/8 in	1/2 in
Gas line OD		3/8 in.	1/2 in	5/8 in	5/8 in	3/4 in
Water Tank Capacity		80 Gal./300 L.	80 Gal./300 L.	80 Gal./300 L.	80 Gal./300 L.	80 Gal./300 L.
First Hour Hot Water		68 gal./hr.	74 gal./hr.	80 gal./hr.	92 gal./hr.	104 gal./hr.
Water fittings/HX Coil ft.		3/4" NPT/33 ft	3/4" NPT/33 ft	3/4" NPT/5 ft	3/4" NPT/50 ft	3/4" NPT/50 ft
Water Flow Rate at 3 FPS		1.2 GPM	1.8 GPM	2.5 GPM	3.6 GPM	5 GPM
Suggested Expansion tank		3 gal.	3 gal.	3 gal.	4 gal.	5 gal.
Heater coil dimension		Immersion: 7/8 in OD x 33/50 ft. Pressure Drop .95/1.45psi.   Double Wall Wrap-around: 2/ 3/8"x60 ft.				
<b>Electrical</b>	<i>Refer to local electrical and building codes for wiring and installation requirements</i>					
Compressor		DC Inverter 230V single phase. 2 wire (L1, L2, G) BX-AWG12-AWG10				
Rated Running current		4.6 A	6.8 A	9.2 A	13.2 A	18.4 A
Max. current		8 A	11 A	15 A	19 A	26 A
Heat Pump Breaker/voltage		15 A / 240 V	15 A / 240 V	20 A / 240 V	30 A / 240 V	40 A / 240 V
Elec. Backup Heater		6 kW	6 kW	6 kW	6 kW	6 kW
Elect. Backup Min./Breaker		26 A./30 A	26 A./30 A.	26 A./30 A.	26 A./30 A.	26 A./30 A.

- A. Area space heating assumes new construction above code at <10 BTU/ft<sup>2</sup>; and to Code at 13 BTU/ft<sup>2</sup>.  
 B. It is the purchaser's responsibility to calculate Heat Loss/Gain, size for 100%, and size for 100% backup.  
 1. Momentary COP Measured at ambient 50 F. and water in/60 F. out/120 F. with Sun 50%, wind 15 km/hr.  
 2. BC requires alternate pipe connection for **Double-Wall protection of Potable water, use coil for DHW.**



Specifications in this datasheet are subject to change as we continue to improve of our product line. Please contact the factory to ensure data is current and accurate before using in detailed design calculations. [www.sunpump.solar](http://www.sunpump.solar)

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## SunPump – 3.5 to 14 kW Construction Rough-In Guide

Prepare for **4 connections** on the right-side; electrical, refrigerant, space and hot water.

**Electrical** has one 15-30 Amp for the Heat Pump; and second 30 Amp for the element. A connection box should be high on the right. See the model label or specifications page.

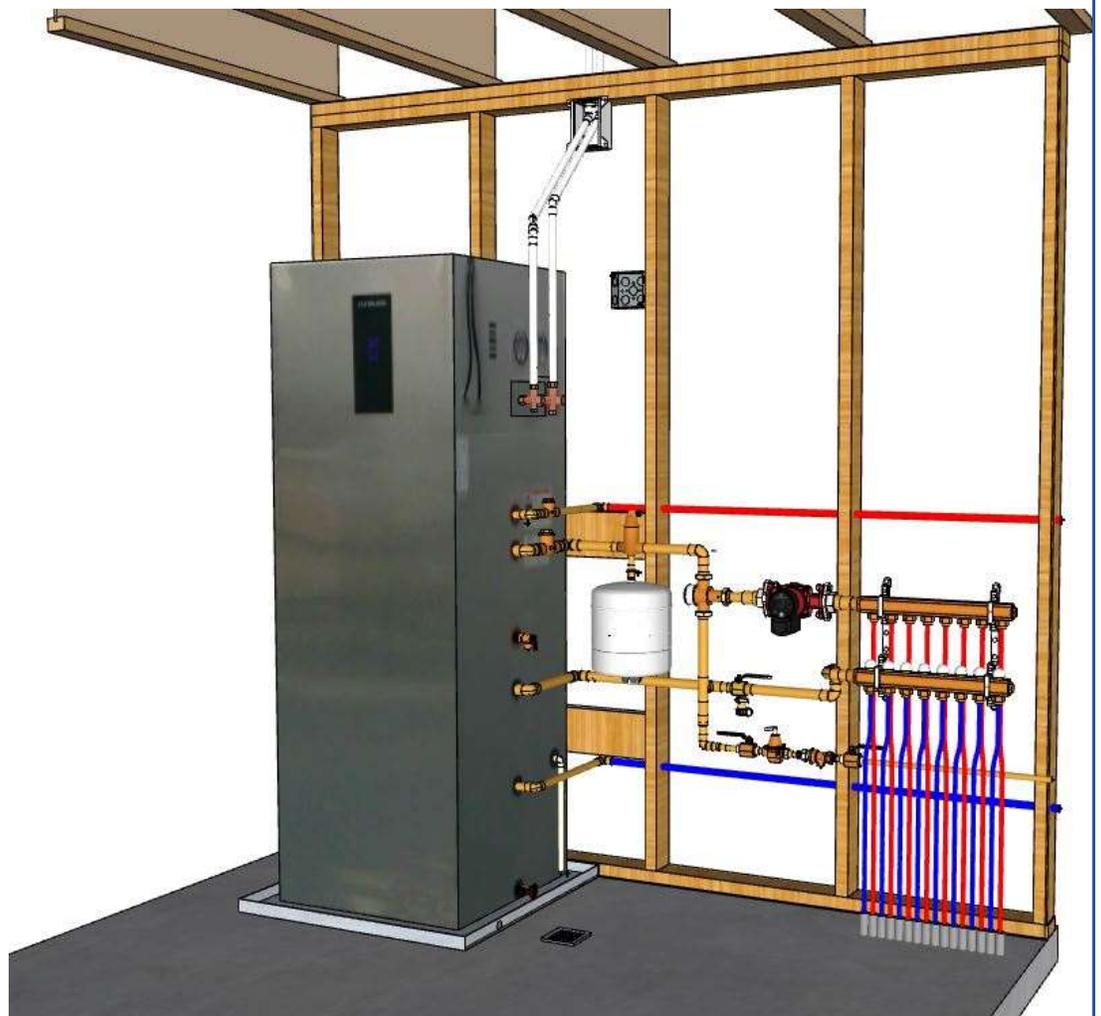
**R410a** pre-insulated copper line set is installed in interior wall conduits. A pair of 2" PVC conduits should be installed from Mechanical room to the Attic using an interior wall and without any elbows – the pipe must be straight. Avoid humid air condensation with sealing. Use a 4"x4" box to finish line-set entrance into room for drywall and air-sealing. Include two 20-24g 2-wire for sensors, one by the Panels, the second to an exterior wall under a soffit.

**Potable Hot water** must use the copper coil where Double-Wall protection is required, with **Radiant Heating water** stored in the tank. For Single-Wall code locations the tank can contain Potable and Coil is Heating.

**Seismic Straps** may require wood backing at 24" and 48" above floor. Use duct cleats.

**Floor drain** is better on the right-side. **Drip Tray** may be required prior to connections.

**Service Access** The indoor SunPump appliance needs 12" on Left plus 24" on Right as a minimum for maintenance space.



Model install on 8-foot wall with radiant floor distribution shown

Ask for the Installer Manual for more details. [solaris@sunpump.solar](mailto:solaris@sunpump.solar)

A [Mechanical Design and Radiant Design](#) service is offered at 1/4 true cost, enquire for a quote

## 5.4 Connect External Air and Panel Temperature Sensors

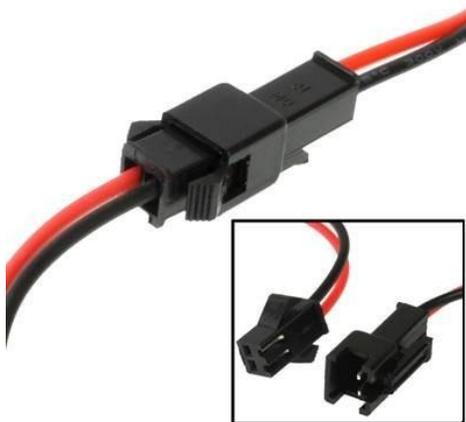
Your SunPump system comes with two NTC 10k Ohm temperature sensors that need to be installed outdoors and connected by AWG22 2 conductor wire to the small plastic connector on the right side of the indoor heat pump unit shown in green as figure **S2** on page 6 parts list. Their purpose is to assist in Defrost and heating controls by measuring temperature through small changes in resistance that correspond. In new construction the wires can be roughed-in from Mechanical room to roof and soffit overhang areas. Make certain **S1** is installed in the lower tank thermistor well, as shown in red on the parts page 6. If it is in the upper Well, move it to the lower for best results.

The small black or white plastic connector is a **JST** type used in low voltage Electronics and Vehicles. It is like the Molex type that also uses miniature crimped pins, but is smaller. Learn how to undue a connection pair, you must depress a catch. Do not try to pull apart by tugging on the wires, the pins are not hard to damage and then the fix becomes time consuming. Be patient, do not use force.

The Ambient Air sensor (bottom right), should be installed on a shady exterior wall, or alternatively under the roof overhang shown in the picture. Do not locate inside the Attic, on the roof, or in the Sun where the accuracy will be lost.

The Panel sensor (right), is fastened securely by a twisted wire strand done with pliers, to a Panel on the smaller ¼" liquid line that is the lower of the two on any Panel. The sensor needs to be as close to the panel as possible, right at the square cut-out is best. The goal is to measure the lower entry to the Panel, where Frost builds up. Do not install on a pipe that is inches away from the Panel because it is less accurate.

Extending the AWG22 gauge wire is simple, but needs to be done with care. Solder the twisted strands and use a shrink wrap to seal joined wires to avoid poor connection aging that will increase resistance and alter the sensor accuracy over time. Installers should consider a JST crimper kit and bulk wire to make various lengths as required. A prepared 50-foot roll with male to female JST ends can plug in to extend sensors.



## SunPump – Line-Set Details

The pre-insulated roll of ACR copper tubing is size for the length of the run from the SunPump to the roof side of a flashing. Refrigeration tube goes by the Outside Dimension, or O.D. Do not use plumbing pipe. The length needed for the 3-D model at right is about 5-feet beside SunPump, plus 10-feet for the floor above, and likely another 10-feet into the Attic and through the roof flashing for a total run of not less than 25 feet. A common range is 30-40 feet. Often a 50-foot roll is used with a short piece left over.

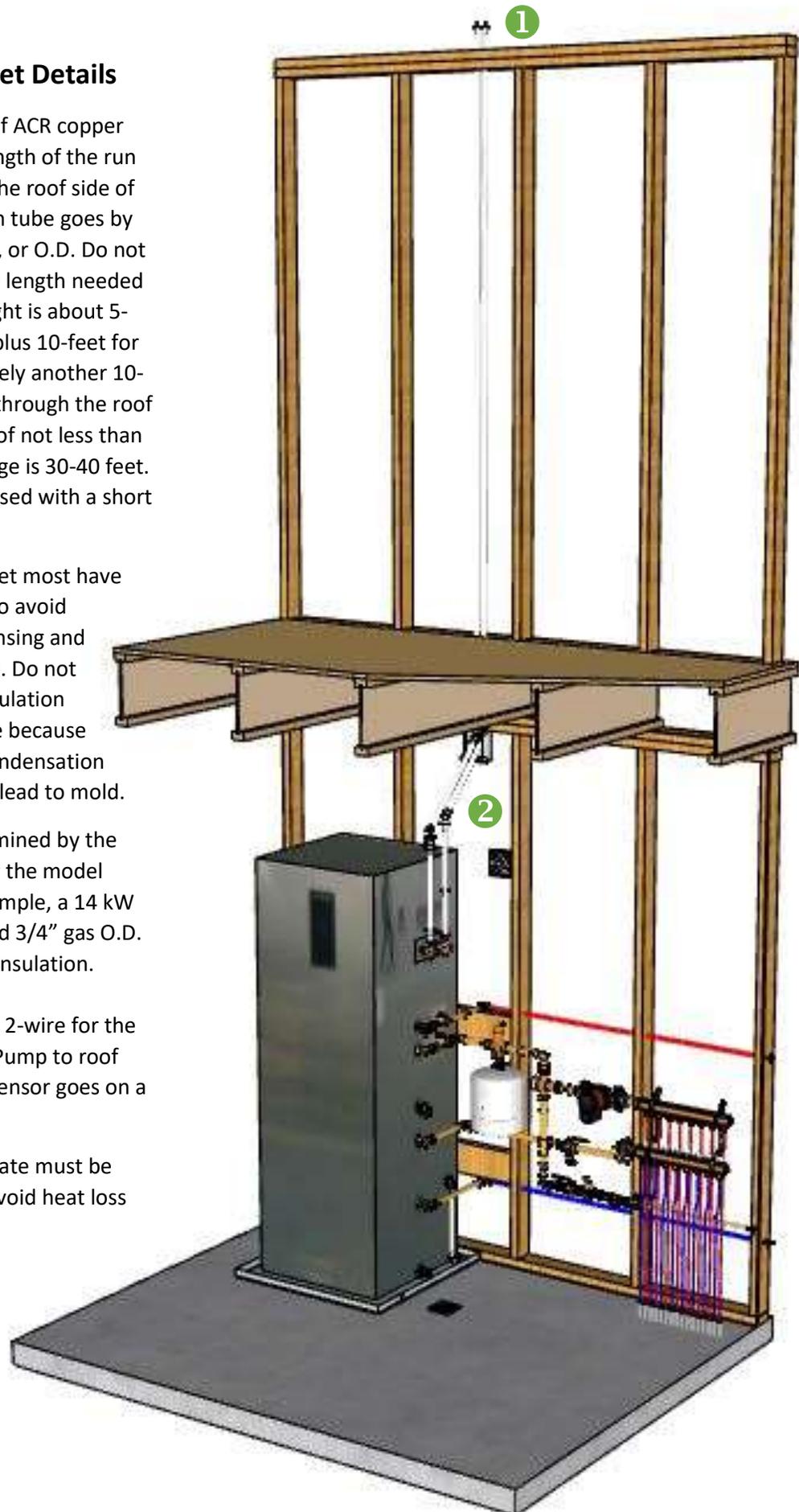
**IMPORTANT:** The line set must have continuous insulation to avoid moist indoor air condensing and dripping inside the wall. Do not use 6-foot pieces of insulation fit over the tube on site because the seams will allow condensation to drip water that may lead to mold.

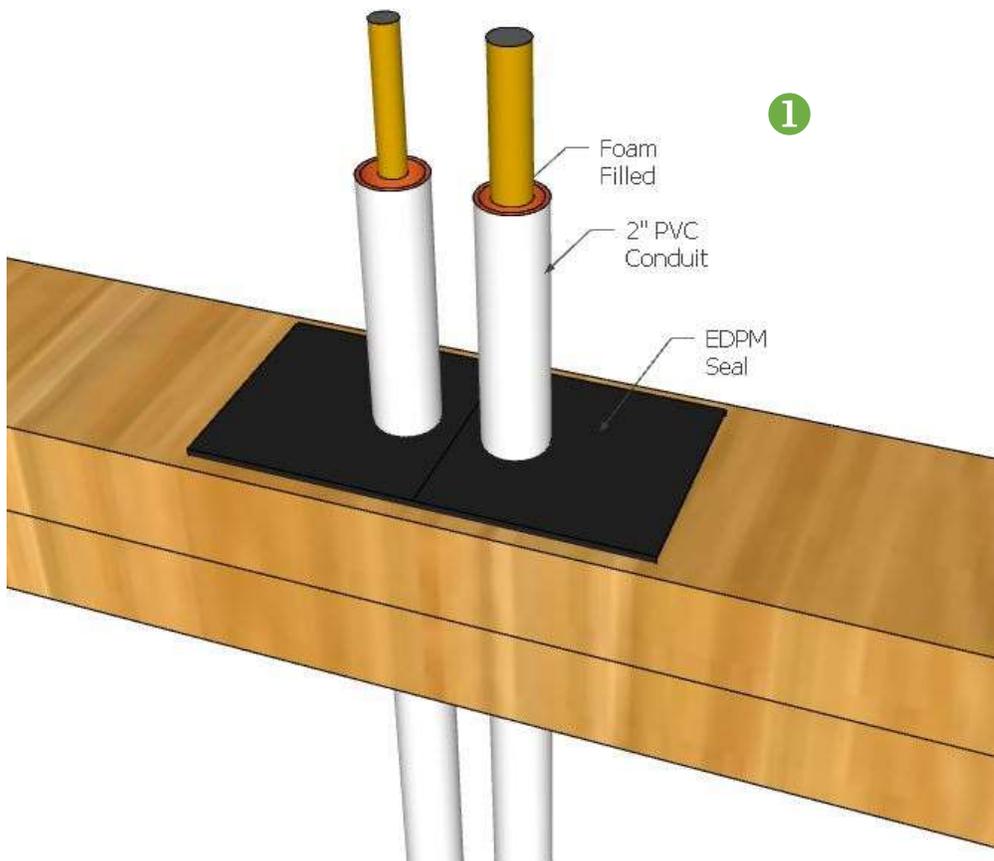
Size of line set is determined by the Specifications sheet for the model being installed. For example, a 14 kW will have 3/8" liquid and 3/4" gas O.D. copper ACR tube, plus insulation.

**TIP:** Include a 24-gauge 2-wire for the panel sensor from SunPump to roof side panels. A second sensor goes on a shady wall nearby.

Holes in the wall top-plate must be taped and caulked to avoid heat loss by air infiltration.

Line Set can go on an exterior wall with a Slim Duct cover.





- The Envelope penetration must be air-sealed to prevent heat loss and condensation issues.
- A Washing Machine utility box is located above the right side up SunPump for the Line St.

